AN OBJECTIVE INTERPRETATION OF MEANINGS

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Paradoxical as it may seem, it is still true that the problem of meanings, which provided so much difficulty for the introspective psychologists, meets with a comparatively simple solution by the methods and materials of the objective psychologist. The introspective psychologist experienced great difficulty in the interpretation of meanings because, presumably, the latter were supposed to possess essentially an inner character, which could not be identified with mental content of any particular sort, meanings being considered still more central than sensations or images. Nor is this difficulty much minimized by the parallelistic behaviorists[1] who translate the specific meaning-factor into partial movements of the eye, hand, or some muscle. For a meaning is in no sense a thing or a content either mental or physiological, but rather an act or an adjustment of the person,[2] which conditions another and following reaction.

I

Our first and fundamental departure from the traditional descriptions of meaning-functions may be summed up in the statement that meanings, in common with all other data of psychology, are definite responses to stimulating objects and conditions. By meanings we understand specific characteristic differential responses to particular stimulating objects in their appropriate settings. Now as meaning-reactions these responses differ from other differential reactions in the fact that the former are not complete adaptations or final adjustments to stimulating circumstances, but rather their function is to condition the specific operation of another succeeding or consummatory reaction. Thus my perception, that is, the appreciation of the presence or the identity of the book that lies before me on the table, is a precurrent or anticipatory response conditioning the further act of picking up the book or allowing it to lie undisturbed.

[1] From our standpoint, of course, a psychological theory does not lose its parallelistic character even though the adherent thereof rejects one or the other series of supposedly parallel phenomena.

[2] That is to say, the complete operation of a reaction system.

Let it be at once noted that a meaning-reaction differs from any other kind of psychological response only in the fact that it serves to condition a succeeding act. Otherwise, it may comprise the same number and kind of factors, such as cortical centers, neural pathways, affective components, etc. In other words, meaning-reactions differ from other reactions only in function. In consequence, they represent the acquisition of various combinations of reactions, such that when the stimulus calls out one of them, it will be a means of bringing the other or others into operation. In other words, meaning-reactions consist of specific integrations of precurrent and consummatory responses, the former of which are already linked with specific stimulating objects or conditions. Thus, when the signal light flashes into the visual field of the locomotive engineer, the perceptual response is coupled with a series of other responses which result in the stopping of the locomotive. From this stand-point the meaning-reaction derives its name from the fact that it serves as a definite means for the functioning of some given reaction, picking up the book or pulling back the locomotive lever.

Since the unit of behavior or psychological reaction is the segment of behavior, or the response to a stimulus, we can, by referring to such a segment of behavior, indicate more precisely how the meaning-reaction operates. In detail, this operation is as follows. The stimulus-object brings into function a definite reaction-system which has been developed in direct contact with the object in question.[3] When so developed, this reaction-system operates as an evaluatory response in the sense that it serves to mediate an appropriate final adaptation to our illustrative object.[4] The point here is that, when we develop a differential reaction to an object in a given setting, we have appraised and evaluated the object from the standpoint of our behavior toward it.[5] This point is illustrated by the fact that all but the most abstruse definitions of things are stateable in terms of how we react to things. A table is "to put something on," as the child describes it. These evaluatory responses are developed, of course, with reference

[3] By a reaction-system we mean the series of factors; sensitivity to stimulus, receptor and effector mechanisms, neural activity, muscular and glandular functioning, etc., which make up part of a psychological response.

[4] A segment of behavior consists of a stimulus and the series of reaction-systems (when there is a series) that is the pattern of response, which constitutes an adjustment to the stimulus.

[5] This development takes place irrespective entirely of whether the person knows it is taking place.

not only to objects but also to the specific qualities and relations of objects, as well as to events and conditions of every description.

When a quality of an object is evaluated, we must observe that in many cases the person's reaction may be much more passive, or we might say the object is evaluated more on the basis of what it does to the person than upon what the person does to the object. In such cases the evaluations of things and their qualities go back to a non-observable condition or action in the organism, possibly an electro-chemical change, which we refer to as the differential sensitivity of the organism to color, taste, temperature, etc. Although, such activities of the organism are hidden from the view of the observer, whether it be the reacting person or some other, they are none the less definite acts, precisely as are the digestive acts, the occurrence of which is unseen and may even be unknown to the food-consuming person. It is possibly not an imprudent suggestion that, while the substantive meanings of simple perceptual objects are derived from active operations upon such objects, the adjectival meanings, on the other hand, are derived from the more subtle and for the most part unobservable reactions which we call sensitivity. In passing we might suggest that our term sensitivity is used in the sense that the physicist uses the term when speaking of the deflective actions of a galvanometer. Obviously, whenever any meaning-reaction is named or brought to the notice of oneself or others, a positive observable reaction is being performed.

Impossible it is to omit in a discussion of meaning-responses the specific reactional auspices under which the meaning-acts are performed, since the stimulating circumstances are not by far the least important of the conditions for the origin and operation of meaning-responses. This means to say that the meaning or significance of an adjustment is entirely a function of its appropriateness in any given circumstance. In other words, meaning-functions symbolize specific forms of interaction between objects and the person's responses to them. The kind, number, and relations of objects to which we react force us to develop combinations of responses for adaptational purposes. What an object means is intrinsically the problem of the particular type of response which the person has developed while in contact with it. As a psychological term, therefore, meaning refers (1) to the significance which an object has for the person as indicated by his reaction to it, and (2) to the particular type of reaction which a given object brings about in the person.

From our standpoint there is nothing strange or inscrutable about meanings. The fact is that the meaning-reactions which appear as such effective adaptational aids to the person are merely the anticipatory responses which the various surrounding stimuli have caused persons to build up or otherwise to acquire. A meaning-reaction is accordingly a fitting adjustmental response which individuals acquire through the direct influence of the surrounding objects and conditions. It is in this way that a meaning-reaction becomes the means for bringing about an especially fitting adjustment of the person to his surroundings. And it is this type of precurrent meaning-reaction which permits us to say that a person foresees the consequences of an act. For it is precisely such meaning-reactions as we have described which make it possible for us to have any delayed reactions. We might even go a step further and say that it is the development and operation of these anticipatory meaning-reactions which are celebrated by the term consciousness. We may repeat, then, that a meaning is a psychological action, in no sense distinct from the many other definite responses which we are hourly performing. In other words, a psychological meaning is not anything mental or psychic, nor is it merely a peculiar muscular or glandular reaction paralleling a mental state, but rather a meaning-reaction is *any* reaction of the person which stands for or signifies a thing or condition by causing a particular response to it.[6] But of course meaning-responses differ from each other and from other members of a segment of behavior in precisely the same way as any two human reactions may differ.

II

Up to this point, namely, as long as we are discussing direct responses to present stimuli, everything seems clear and definite enough. But uncertainties appear at once when we consider the behavior in which the objects to which we adjust ourselves are not immediately present. How, we might ask, can we interpret the meanings and intentions concerning persons, things or other stimuli which are not at the moment within range of our actions? Here we have the problem of the detached meaning-reactions which are usually referred to as thought and imagery. To the objective psychologist it

[6] Regardless, of course, of whether the person knows what is taking place. In order that the reacting person should also *know* what is going on, he must not only be determined, because of some precurrent reaction, to perform a definite final adjustment, but in addition he must be able to report to himself verbally or otherwise that such an event has taken place.

seems an extreme error to overlook the unquestioned continuity between what may be called the perceptual and non-perceptual meaning-reactions. Imagery, or non-perceptual, meaning-reactions are no less definite responses of the person than are the meaning-reactions contained in segments of behavior in which the original object is present.

As a matter of fact, every genuine perceptual response already involves a partially detached or implicit reaction, in the sense that the specific perceptual phase of the segment of behavior is a revival of a differential response to qualities and conditions of objects not at the moment in actual contact with the organism.[7] The main point here is that a differential reaction system or pattern of response which was acquired in the original contact with the object in question is upon a second or later contact with the same object put into operation in the same way or in a slightly modified form.[8] When the object which originally caused the reaction to be built up is absent, the differential reaction system can still be put into action by a substitution object. In this case, of course, the reaction system will be an implicit or an incipient operation. The response will occur only in part or in some lesser degree. There is no reason to suppose, however, that such an implicit response to an object not present, does not involve the same neural, receptor, and effector apparatus.

Furthermore, since all implicitly operating reaction systems, no matter how closely they resemble the original act, are substitutive reactions we are not surprised that it is possible for them to become symbolic. That an implicit reaction system determining a succeeding response can be very unlike the overt act which would ordinarily stimulate the succeeding response, or entirely different from the overt response which a given object elicits, is traceable directly to the fact that every implicit reaction is already in some sense a representative activity. Whenever we respond to an object not present, be it in a dream, revery, thinking, or planning of whatever sort, then we are symbolizing or representing the object or situation constituting the original stimulus to our behavior. Now although there is no limit to the degree with which the implicit response varies from the original reaction to the same object, still there are definite determining conditions which make for the specific symbolization of objects by particular

[7] Cf. Kantor, Suggestions Toward a Scientific Interpretation of Perception, *Psychol. Rev.*, 27, 191 ff.

[8] Such modification depends upon the setting, or the total stimulating situation.

reaction systems. These determining conditions are for the most part contained in the original environmental setting of the object which is being reacted to. Just why my implicit reactions to the city of Washington should invariably involve a symbol of fatigue is no doubt explained by the fact that my first contact with that city included an ennervating round of continuous sightseeing. As every one knows the implicit reaction systems of thinking processes appear in most cases as entirely unlike anything that we should expect to be connected with the original stimulating situation. No further illustration of the peculiarities of symbolized implicit behavior is necessary than a reference to the facts of individual imagery differences.

Although it may not at all reinforce our conviction that an implicit meaning-reaction is a detached response to an object, it is well to observe just how a reaction system or response pattern can be detached from a situation in which it was first acquired. We have here really two problems. Not only must we account for the detaching of reaction systems, but we must also describe the mechanism by which such detached reaction systems are put into operation by some substitute for the original stimulating circumstance. Naturally enough these are reciprocal problems and the solutions are closely intertwined.

In general, the possibility of detaching reactions from their original settings goes back to the elementary fact that human persons are from the psychological standpoint organizations of response systems. A psychological fact consists of the operation of one of these reaction systems resulting in the adjustment of the person to an object or condition. Of the most elementary of these adjustments are the connate reflexes and the sensitivity to colors, sounds, etc. By contact with objects these primitive responses may become integrated into more complex adjustments to objects or into reaction patterns; so that the person will respond not only to color and shape, but also to the complex objects as a whole. Nor does the reaction to objects define the limit to human reactions. Suffice it to suggest that the next hypothetical step is the organization of the reaction to include the setting of the object. Mark well our point, namely, that the whole of the individual, psychologically speaking, is an enormously expanded series of such potential responses.

Now it so happens that such reactions are sometimes called out when the original objects responsible for their existence are absent. That this operation of the reaction system can

occur without the instrumentality of the original stimulus is accounted for by the existence of some common factor in the present and past situation. And so the infant may proceed to suck any object, although it may only very remotely resemble a nipple. In more complex situations the common element responsible for a given reaction may be the setting of the stimulus, and not any quality of it. Illustrative of the latter situation are the mistaken reactions resulting when we respond to a stranger in a way in which we have accustomed ourselves to react to a friend, who usually is found in the place which the stranger now occupies.

Again, a person is stimulated by wants, organic necessities, and desires, to reinstate some reaction system previously built up under entirely other auspices. A hunger reaction may stimulate us to reach for and perform other incipient reactions to food-objects, although no food-objects are to be found in the vicinity. To a certain extent, also, we might consider that the process of detaching reactions from the original stimulating circumstances in which they occur is merely a process of continuing an action once the original stimulus for it has passed. As an example we might refer to the tense organic strain and reverberation of the person who virtually is unable to stop running or rowing for some time after the actual contest is over.

We may conclude, then, that the different mechanisms for detaching reactions from their original settings involve in some sense a rearousal or a functional continuance of a reaction system. When the rearousal occurs we may trace the stimulus back (1) to some object or condition other than, but previously connected with, the original stimulus object, or (2) to some present reaction of the person serving as a stimulus to such reoperation of a reaction system. No matter how the rearousal takes place, the detached reaction may become a means and a determiner of the operation of an associated succeeding response. What this associated response is depends upon the specific experiences of the person. Plainly, it is extremely important for the process of detaching reactions from their original stimuli-response situations that there be some similarity and resemblance between the various objects and situations concerned; so that they can substitute for each other as stimuli.

III

Thus our discussion brings us up squarely against the problem of the image, since it is pretty clear that imagery reactions are detached vestiges of sometime overt reactions to con-

crete objects. Imagery responses, therefore, must be considered as one of the types of the individual's reactions, along with overt responses and others which determine the immediately succeeding reactions to things. What the proposed hypothesis demands of us to believe is that every psychological process is a specific operation of the person to given objects or situations. To accept this theory means to believe that any perceptual activity is a particularized action, performed when stimulated by any given object with all its qualities, as it comes into direct contact with the person. That is to say, the theory demands that we do not assume that the qualities of things or the things themselves exist as central material, or *in consciousness,* as the textbooks put it. Lest there be any question as to our meaning at this stage of our discussion, we reiterate that, in every case of psychological reaction, perceptual responses by no means excepted, the person reacts to a thing in which inhere all of its qualities. Hence we are not obliged in the case of imagery reactions to account for central qualities. The difference between perceiving and imagining a book lies in the fact that in perceiving it we react to it with its qualities, while, when we imagine a book, we must supply the qualities and relations of things, at least when the imagery is vivid, by means of verbal or language substitutions. This fact accounts for the usually greater vividness of the perceptual reactions. And here we might suggest that the traditional difficulties with imagery reactions are born of the prejudice that the image which is presumed to be the carrier of non-perceptual meanings is a peculiar central process absolutely independent of receptor systems and muscular mechanisms, in addition to being otherwise related than are sensory processes to cortical centers. From our standpoint an image response is a reaction system, in principle precisely like any other, involving exactly the same factors, but differing from other reaction systems in that the former are in some manner distantly removed from the primary stimulus-response situation in which they originally developed.

And what precisely is an image? Why simply this, a vividly repeated reaction system or pattern of response to some specific situation, plus the speech reactions descriptive of the objects and events reacted to. In many cases the nature of the image depends upon its verbal purveyance, in the sense that the reported qualities of imaged things are supplied by the person himself. This fact is clearly demonstrated when we attempt to imagine an object which we have

looked at some time ago or perhaps have never actually seen. The infidelity of testimony illuminates the possibilities in the way of adding materials to past objects and events. To be entirely specific at this point, we must indicate that much of the image experience is really a verbal self-analysis of how we respond to an absent object. Thus, contrary to popular conception, the most intense imagery reactions are those in which the person repeats verbally the scene he has just witnessed or has otherwise partaken of. Consider the young lawyer just returned from his first important legal argument, or the lover rehearsing before himself as auditor the scene just preceding the capitulation of the most adored one. The amount and intensity of the imagery depends upon the impressiveness and the intensity of the original situation.

Although much of the image reaction is verbally supplied and verbally stimulated, yet the basic fact in any imagery experience is the actual responsiveness and organic functioning which is involved in the implicit repetition of a person's activity. Anyone attempting to recall what happens when deeply suffering from the pangs of remorse, or writhing under the lash of insult or the sting of disappointing dejection, will have no trouble in appreciating the definite activity of the person. Impossible it is to overlook the shuddering of the entire person, the palpitation of the heart, the activity of the salivary, lachrymal and other glandular processes which take place, when we remember or think about some distressing or very pleasant experience. Above all, we must bear in mind always that we are attempting to describe the behavior of a tense superactive organism, and not the products of a cold logical analysis. What happens when any of our imagery experiences become blunted, as is practically always the case with the passing of time, is that the pulsation and quavering of the organism have subsided.

From the fact that the core of imagery reactions is a definite liberation of the person it follows that by far the most vivid imagery is that in which the individual is himself living over a profoundly impressive experience. So vivid at times is such imagery that one may appear to be in a certain place and actually to speak and otherwise react to persons, when as a matter of fact one is at great distance from both the person and the place which are now being implicitly reacted to. Moreover, an implicit reaction to a past experience may involve almost as much actual expenditure of energy as an overt adjustment to a less intense situation. Less vivid, naturally, are the imagery responses which constitute

implicit reactions to conditions with which one is not personally concerned. In general the energy with which our implicit reactions operate depends upon our capacity to relive the original situation. And so the warmth with which one sympathizes with another person who suffers some tragic experience is dependent upon the fact whether the sympathizer has himself played a part in a similar event, and is consequently able to relive it, to image it better. Here we find the psychological basis for the emphasis which the employer places upon *experience* as a qualification for employment. It is this, that having previously made reactions to a type of situation, one is now better equipped to react implicitly to the same or a similar situation and thus be more resourceful in the present circumstances.[9]

Because the implicit meaning-reactions are so easily performed and occur so much more readily and quickly than the explicit type of response, and moreover because the former are so subtle and representative, they serve as the most capable and efficient of meaning-reactions. Indeed, even though the older psychologists did not fully recognize the character of imagery, they hit upon images as the exclusive type of meaning-responses. Not even the mistake of making images the only type of meaning-reactions can rob those psychologists of the credit for their insight into the character of imagery reactions. Just how efficient these implicit reactions are may be gathered from the consideration of a thought or a planning segment of behavior, in which the compelling stimulating circumstances induce a very intricate interplay of implicit reactions, serving on the whole as backward references to events in the life of the person important to him in the particular circumstances, besides enabling him to anticipate future possibilities of action. Of course in any serious problematic situation the person will combine such implicit responses as we have attempted to describe, with explicit handling of maps, statistical tables, drawings, slide rule, books, and other such instruments of complex human behavior. The explicit acts serve as stimuli to actions as well as being themselves adaptive responses. We hasten to add that, by considering the actual complex of implicit and overt reactions constituting a planning behavior, we gain insight into the actual continuity of such actions throughout all their variations.

[9] We can no better illustrate the repetitive nature of an implicit reaction than by pointing out the necessity of repeating reactions in order to recall or understand them, or to reproduce facial expressions in order to appreciate their significance or to name them.

IV

If our hypothesis concerning the nature of meaning-reactions is valid, it follows as a matter of course that the implicit meanings cover a wide range of precurrent responses. Now as a matter of fact, all of these responses may be roughly grouped between two limiting classes, which we will name representative and substitutive. By a representative meaning-reaction we understand a reaction system similar to one performed upon a previous occasion and now serving as a determiner of a succeeding reaction. Thus the representative meaning-reaction is a direct vestige of a previous reaction situation, and consequently is morphologically a fairly overt response, in the sense that it incipiently repeats a former response. Such representative reaction systems, therefore, stand upon the borderline between the overt and implicit reactions. We may consider as examples of the representative meaning-reactions all of the imagery responses that we have discussed; remembering, however, that other representative meaning-reactions involve the elaborate movement of external skeletal muscles.

At the opposite pole from these representative reactions stand the substitutive responses, which, though functioning as determiners of reactions, are themselves morphologically completely at variance with the overt act producing the same result. These substitutive responses, while of course definite acts of the person, do not in any sense resemble the reactions to the objects for which they substitute; they may be totally symbolic; and so difficult is it to seize hold of such meaning-responses that their operation in many cases is frankly inferred. The fact is that the symbolic reaction may involve such an act on the part of the person as he himself has no notion of. In the literature of psychology the substitutive or symbolic reactions are denominated concepts or thoughts. So distantly removed are the substitutive responses from the original conditions to which the person is adjusting himself, that the stimulus to thought action is a total situation or problem. Now, the detailed facts of the stimulating situation are supplied to the person by drawings, writings, or verbal stimuli. The general problem, however, may be looked upon as the directing and controlling stimulus.

Between the fully representative and the substitutive reactions we find interpolated the language responses which constitute a most efficient form of meaning-reaction. The marvellous effectiveness of the verbal reactions to determine behavior lies in the fact that they are not only completely

overt morphologically, but they represent the most facile of all our performed actions and at the same time they are capable of infinite modification. In consequence, verbal responses are among the most satisfactory substitutes for all sorts of objects and acts. Finally, the language reactions constitute so pervasive a form of human activity, that they connect with and bring to the surface the deep seated conceptual responses. Thus, the conceptual responses, for example, are most serviceable for reactional purposes when they are associated with language acts. This fact is evident when we consider that ideas are simple concepts which, because of their attachment to verbal reactions, serve to induce responses in oneself and others.

V

Before proceeding to a brief description of the conceptual reaction we might raise the question how the implicit reaction, which resembles in no way the original object or the original reaction, can be said to be a reaction to that object at all. The answer to this question is found in the consideration of the manner in which the reaction operates. The substitute reactions operate as precurrent or anticipatory responses to some other final reaction, and this is exactly why they are meaning-reactions. As we have already indicated, the entire significance of a meaning-reaction lies in the fact of its operation as a determiner of a succeeding final response to a given stimulating object or condition. Whether a given reaction system is a response to a particular stimulus depends entirely upon its functional connection with that stimulus.

Concepts are reaction systems which operate when it is necessary for us to make immediate use of large segments of our past experienecs in rapid and effective ways. The mechanism for this activity is as follows. Some problem presents itself to us, the construction of a bridge, let us say. It is necessary for us to correlate this problem immediately with other problems of a similar sort, in order to make plans for the new structure or to draw up an estimate of cost. In terms of the old work, old conditions of all sorts, we must project and create the new object or condition. For this purpose we have a stock of concepts or ideas representing our past experience of a particular sort, which now conditions the actions of making plans, submitting estimates, and directing the actual bridge construction.

The concept is therefore a vestigial remnant from a previous situation or rather a series of situations; for a concept

is a standardized and definite implicit response which substitutes for and sums up the person's experiences in a form useful for present purposes. Plainly, the capacity to develop concepts depends upon verbal aids, since only through such symbolic means can we build up such meaning-functions as concepts are. Not only are language functions necessary for the development of concepts or standardized meaning-reactions, but the use of them depends very closely upon word responses. It is through words (spoken, written or printed) that concepts are primarily stimulated to action. Hence we may look upon a treatise as an extension of the person's implicit reactions to things. By means of a treatise we are enabled to sum up and record the significant facts of our past experience.

Incidentally, there is brought to our attention the distinction between different types of concepts, namely, those standard implicit reactions summing up our own experience, and those concepts which are derived from our indirect contact with things, from our reading and hearing of bridges built, for instance. Obviously, the largest number, by far, of our more important concepts are derived in the indirect way, although it is an essential factor in the development of a concept that the person must have had some personal experience with the fact or conditions represented. The degree to which we are unable to grasp a concept or have one communicated to us is a direct function of our lack of experience with the facts and conditions represented. When we have had no actual contact with a certain object or condition we can have no concept of it, and therefore we can only have verbal substitutes. Every teacher, it is almost safe to say, has met with persons who function as students entirely on the verbal level, or almost so.

In considering the differences between a scientific concept and one developed in everyday life we cannot overlook the deliberate operations which the scientist performs upon the materials with which he deals. We might look upon this deliberative activity as in part a direct manipulation of materials and apparatus and in part an implicit handling of these materials with direct reference to previous experiences of the same sort. All of this activity is performed with the constant aid, and by means of, communicative language activity, both stimulative and responsive.

The distinction between scientific and everyday concepts marks a difference in the levels of our behavior. These levels may be arranged in series from the mere implicit contact of

the person with things to a thorough understanding and manipulation of objects for certain definitely appreciated purposes. The actual basis for the distributive arrangement of the levels of behavior lies in the intimacy of the contacts of the person with the objects and conditions to which he is adapting himself. Clearly, the intimacy with which one is in contact with surrounding things is not in direct correlation with the overtness of the response. For obviously we may produce more important effects upon things by the indirect responses of thinking than by most direct contacts of a perceptual sort. Now in point of fact, the scientific concepts operate in a more remote way upon objects than do the everyday concepts. As we have previously suggested, we may consider scientific concepts to be reactions operating upon a level of deliberated and motivated action and therefore very different in degree from everyday concepts. From the fact that scientific concepts are practically identical with ideas, we may infer that the difference in degree between concepts parallels such crystallization of reactions as to make them available as stimuli to actions.

In a sense, a conceptual act is a self-stimulating reaction to further implicit behavior, so that a thinking activity which is essentially a manipulation of concepts is a continuous activity of the person with respect to some object or condition. When the conceptual reaction becomes so standardized and identified with a term or name that it may serve as a common stimulus to various persons, then we may call it an idea. The intimate connection between the concept and the communicative language form makes the concept a definite object of scientific technique, much as a piece of apparatus is. Absolutely essential is it for the functioning of ideas that they be embodied in language forms (names, etc.) and it is true, as a matter of fact, that such ideas are indistinguishable from the expressive language which serves as their medium of circulation. Thus language appears as an indispensable tool for both the operation and the expression of thinking.

VI

The development and functioning of language responses indicate most excellently the facts of meaning-reactions. For language is essentially a determiner of action, whether in the vocalizing person or in some other. In the fact that action is determined in others we find a basis of division of language mechanisms into mere vocalization and communicative

speech. The latter type of meaning-reactions are not, however, confined to communication with others, for obviously one may also communicate with oneself. The differentiation between verbalization and true language activity, or between mere speech and communication, involves a difference in the total behavior of the person at the time. Essentially the total situation includes not only the responses of the person but the stimulating circumstances also. As to the latter, they must be such as to interest or challenge the reacting person, interest him in the form of satisfying his wants, as the mother or nurse functions to the desiring child. Or the stimulus may arouse or awake the person to a response which will in turn induce in the stimulator another response. Here we have of course ordinary conversation. As contrasted with mere verbal utterance as a determiner of behavior, communicative speech involves a definite attention set and an attitude of serious expectancy which puts the person in close *rapport* with the stimulating person.

All language in the sense of action determiner or verbal stimulus goes back of course to the articulate function of human beings, and we might assume that speaking or the use of words, both as mechanism and as psychological acts, derives directly from crying through the path of vocalization. All the observable facts of human language are constituted by the processes in which the crying mechanism and action develop to the stage of definite communication.

Much light may be obtained concerning the development and use of language from a study of the reactions of infancy. The growth of language may begin as a mere manifestation of a need. That is to say, the observer notes the infant acting in a particular way when he is apparently stimulated by some exteroceptive or interoceptive stimulus. This reaction may appear to the observer as a stretching out of the hand or a cry. As it happens, the reaching or crying occurs when the infant is stimulated by objects he cannot reach or otherwise adequately make responses to. The reaching or crying is, then, a gesture or stimulus to the mother or nurse to complete the necessary reaction, and in this manner the reaching or crying of the child becomes a means of finally attaining some result. For a long time the child's activity has no significance to him in the sense that he has no manner of appreciation of its operation. At this stage the action of the child is a bare meaning-act or a means to some other reaction, playing with the ball or drinking the milk.[10] Because of the particular situ-

[10] We ignore absolutely any standpoint of an observer.

ation this reaction of the child to be sure is pregnant with potentiality to develop into genuine language.

Another stage in the development of language involves the appreciation by the child of the stimulating character of his reaction. This appreciation arises from the observation of the close connection between his own beginning and final reaction, and that of the mother, since the latter's action is a necessary part of the total situation. In many cases this appreciation may merely amount to the fact that the mother has trained the child to substitute a true stimulus word (name) for the original crying or reaching stimulus.[11] Since the development that we are describing consists mainly in the child's learning that his act is a stimulus, the use of a name is not an essential part of the development. Any sort of gesture will do. The entire criterion for the description of the developmental stages in the language reactions lies naturally in the specific ways in which the person is in contact with his surroundings.

Distinctive as a stage in the development of language reactions is the performance of verbal actions as stimuli-determiners of the actions of others. We have already seen that this stimulating act may be merely the expression of a need which is satisfied through the act of another. Later, this stimulus is uttered as a deliberate means of achieving some definite end. Obviously, the best means of accomplishing such purposes is by the use of connected speech-stimuli. "Get-me-this" may be considered as a typical illustration of such a connected speech determiner of action. And it is very important to observe that we have attained here a stage beyond the mere use of name words. In fact we may think of this communicative-stimulus or deliberate, transmissive reaction as a phrasing or speech-expressing reaction which transplants simpler need and want reactions. These connected speech reactions are definitely made to exhibit or express a need, desire, or some other condition of the person, or an implicit response of quite another sort. Such language reactions essentially involve segments of behavior including reaction systems of at least two individuals, either as stimuli or responses.

In this stage of language development words or their equivalents are not mere substitutes for objects or acts but are definite stimuli for one's own reactions or the responses of others. A clear example of communicating with oneself is the use of language in the formulation of plans or the application

[11] That is, stimulus for the mother.

of pencil marks upon paper during the solution of a mathematical problem.

By far the most elaborate use of communicative language reactions is found in the informational responses which are stimulated to action by another person or his presence. Especially is this the case in informational reactions in which one person apprises another concerning objects or events which have long ceased to be actual factors in the surroundings of one or both persons. By means of communicative language reactions, not only can old events be revived and brought again to the surface, but in general one person may inform another of comparatively new objects or events by way, of course, of stimulating in the other person implicit responses representative of similar conditions.

In general, we might look upon language reactions as instrument reactions; they enable the person to extend his activities and to reach across all sorts of barriers. The use of language reactions puts the human individual upon a definite and characteristic level of action. As instrument reactions, language represents one of the highest developments of the meaning-responses. Not only is language a determiner of overt and implicit reactions of all sorts, but it also serves at the same time as a complex means of developing newer and more capable reactions. We have already suggested that the great efficiency of language acts lies in their capacity to integrate with other reactions and thus form a part of all planning, thinking, and choosing. To a considerable extent language responses constitute the primary factors in the higher types of delayed reactions. We might add in passing that it is the capacity of verbal responses to integrate readily with other reactions, and not any mysterious power, which makes of language such a distinctly human form of behavior.

To obviate any misunderstanding, let us state at once that our remarks concerning language do not apply to printed words or signs, nor perhaps to written words. Since, obviously, printed words or sentences, not being reactions at all, cannot be meaning-responses. They are stimuli pure and simple, although the act of producing written words may be considered to be a meaning-reaction of a highly sublimated sort. In this connection it is well to note that there are distinct levels of action, and that a distinct difference exists between the spontaneous meaning-responses of a personal sort and the deliberative institutional acts constituting the publication of a theory by a scientist or the formulation of a law by a legislature. The latter acts are means to some other acts, of course,

but since they function much less directly they belong to a different level of behavior. Such acts are means to other acts through the instrumentality of institutional or common stimuli, and are not themselves personal stimuli. Written and printed language are common stimuli, and hence are psychological data in no other sense than is any other type of stimulating object. The acts producing these common stimuli are just as indirect means to reaction as are those which result in the construction of a house, or driving an automobile into the path of traffic.

VII

We conclude, then, that the problem of meanings in psychology involves no other factors than those which are dealt with and described by the ordinary methods of objective science. Not only the simple reactions of the person while in direct contact with objects, but also the most complex thought and memory responses, are definite integrations of responses and stimulating conditions. In other words, the most intricate intentional action may well be considered as an elaborate organization of the person's actions under definite conditions of stimulation. Incidentally, we observe that meaning-responses are not limited to thought processes, but are parts of reaction patterns including all types of reactions. From this list of reactions, habit responses are not exceptions and in fact in every segment of behavior in which there are two or more reaction systems, one serves as a precurrent determining response for others, and therefore answers to our description of a meaning-reaction.

Since precurrent reactions are both overt and implicit, we shall find both types of responses operating as anticipatory determiners of action. For these two types of responses merely represent the different ways in which the person responds to his surrounding stimuli. Our discussion has indicated that the list of precurrent reactions includes not only concepts and images, but also language reactions and other more definitely direct operations upon stimulating objects, namely, those involving the skeletal musculature.